1: Longrigg G-4, 5 (ca. 1915-1940) MHI Iraq MHI

movements and haunted ministerial ante-rooms now thought of seeking their advantage by Government action rather than by tribal disobedience. Reports made in 1926 show satisfaction at the decrease of raiding, the willing recourse of tribesmen to the Sarays, better Government control, and fruitful use made of the Tribal Disputes Regulations—one of the most valuable legacies of the British régime.

8. DEVELOPMENT

If major irrigation works were precluded in this period by the poverty of the State, it was no less valuable that a permanent irrigation service, staffed by specialists and relying on ever-widening surveys, was watching conditions, accumulating data, constructing small works of immediate value—canal-heads, regulators, realignments—redesigning vital flood-banks, and planning the future. Without it, the stagnation and deterioration of the Turkish era must have continued, and the serious floods of 1923 and 1926, which with disastrous damage inundated outlying quarters of Baghdad itself, including a railway station and Customs warehouse, must have been yet more ruinous. Considerable canals from the mid-Euphrates left-bank above the Barrage—the Saqlawiya and Yusifiya—were re-created and their lands carefully allotted. The Hindiya Barrage itself was extensively repaired and improved. The Department of Irrigation was administered by A. B. Aitken until 1921, by P. J. Sellier until 1925, and J. M. Wilson during that year, and by L. E. Bury from the Sudan from 1925–8.

In the field of agriculture, a department under an 'Iraqi director-general since 1924, J. F. Webster was Inspector-General in succession to the pioneer of Iraq cotton-growing, Roger Thomas; but here, too, far less could be attempted than the needs of the territory demanded. Land settlement could not yet be other than local, ill based, and occasional; the disastrous agrarian background was unchanged; and experiments in new crops, silk-growing, and seed varieties made at the Agricultural Institute must remain at present without effect on the prevailing practices of an agriculturally primeval peasantry. Nevertheless, a beginning was made with scientific cotton cultivation, for which high hopes were formed; the British Cotton Growing Association opened an agency and erected a modern ginnery. A large-scale general farm on mechanized lines was started by an Englishman near Mosul, but did not long survive. The Wolfra Syndicate, which hired land on the Diyalā and attempted modern farming methods, similarly could not overcome native conservatism and renounced its enterprise. The King himself owned an important estate near Khaniqin, and

1: Longrigg G-4, 5 (ca. 1915-1940) MH1 Iraq MH1

242 651 farmed it with improved techniques; and an 'Iraqi-Syrian group, that of the 'Asfar concession', signed with Government in 1924 an ambitious land-development and irrigation agreement, involving the construction of the Habbaniya reservoir, a Faluja barrage, and a dam on the Diyalā. Limited cotton-planting without notable success was carried out in 1925 by an Asfar affiliate, Diyala Cotton Plantations; but the terms of the main concession were soon afterwards called in question by popular outcry, its semi-monopolist nature was revealed, and the whole enterprise was perforce reconsidered.

242 Meanwhile, a Government anti-locust organization, on the scale which this ruinous pest demanded and using every known method, came into being in northern 'Iraq while Government participated in interstatal plans jointly established in Damascus. The deplorable harvest of 1924, the result of excessive cold and rainlessness, was a reminder of the precariousness of agriculture. The small Veterinary Department under Chadwick, besides its work with Army and Police horses and its civil animal hospitals, did what it could to control the endemic and epidemic diseases of the 'Iraqi flocks and herds, especially rinderpest which caused great annual losses.

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553 494 Roads, mechanical installations, and buildings were the responsibility of the Public Works Department, of which the Directorship was passed by J. M. Wilson, in that office since 1920, to A. S. Clay in 1925. Roads were still at this period unsurfaced and deep in mud or dust, but constant care kept them somehow open. The mileage of road and track available for wheeled transport increased threefold, and hundreds of passenger and freight-carrying cars plied on every route. The care of these, with their accompanying repair shops, supplies, and dealers formed a new branch as much of industry as of travel. A trans-desert motor route, passing by Ramadi and Ruṭba to Damascus and the Levant, was inaugurated in 1923 by two New Zealanders, the Nairn brothers, whose headquarters was at Damascus. It had immediate effect on 'Iraq's foreign orientation. The service in 1926 absorbed its first (Syrian) competitor, which, using a track by Hit and Palmyra, had been the victim in 1925 of a savage attack by Dulaym tribesmen. The Ruṭba–Damascus section of the Nairn route became unusable in the summer of 1925 by reason of the Druse rebellion, and for a year thereafter convoys were diverted to 'Amman and Haifa through the forbidding lava country of Transjordan. The carriage of mails by the desert motor route became usual, until air-mail services superseded it. Postal arrangements within 'Iraq, now under 'Iraqi administration with British expert advice, grew more comprehensive and included all normal post office services. Telegraphs were

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1: Longrigg G-4, 5 (ca. 1915-1940) MH1 Iraq MH1

The Latifiya was no longer the only large-scale modern estate in operation. The Date Board, which had done much to modernize and stabilize the production and marketing of dates—and not those of the Shaṭṭ al-'Arab only—had wisely retained the system of export monopoly, with suitable amendment of terms and prices, throughout the war and after it, but the three-year extension granted to Andrew Weir & Company in 1950 was likely to be the last; the National Date Trading Company founded in that year would probably assume the functions of the export monopolist. Of the Company's own shares, 49 per cent. were allotted to the Date Association, 26 to the public, and 25 to the foreign packers and exporters.

Government maintained a College of Agriculture with a three-year course and main experimental estates at Abu Ghurayb (for agronomy, animal husbandry, pests, and soils) and at Za'faraniya (for horticulture, fruit, and vegetables), with smaller stations at Bakrajo, Ḥawija, Nineveh, Aski Kellek, and Baṣra, a main forestry station at Arbil, and nurseries in every liwā. Its experts selected, tested, and issued new seed varieties designed for higher yield, quality, and resistance: combated pests, notably by locust campaigns in the technique of which 'Iraq claimed to lead the world: caused the erection of a grain silo at Baghdad, and proposed another and greater at Baṣra, with modern grain storage bins at many centres. The department was in touch with local industry which could use as raw materials 'Iraqi oil-seeds, cotton, dates, barley, beet, wool, and tobacco. It was planning large-scale experiments in estate-management, and seeking crop rotations which would diminish the use of a fallowing system now recognized as intolerably wasteful. It was encouraging the growth of rural co-operative societies under the 1944 law, increasing its departmental Inspectorate, and founding Chambers of Agriculture. It interested itself in rural education and established agricultural schools in every liwā. It was promoting village settlement, in which field the interesting and promising Dujayla smallholding community (p. 323) was extended and perfected, and the foundation of others in the Ḥawija and elsewhere was put in hand. The Development Board allotted in 1951 more than 4 million dinars for the provision, in six years, of artesian wells and drinking-water supplies. The mechanization of agriculture was fostered by a country-wide system of depots and repair shops, administered as a Government monopoly under a special law and a separate Directorate-General; indeed, all the importance of mechanization—even with its serious difficulties of proper maintenance and supply—was appreciated as part of a future 'Iraqi agriculture which with great new areas under controlled irrigation was likely to find not land or water but man-

1: Longrigg G-4, 5 (ca. 1915-1940) MH1 Iraq MH1

power as its chief limiting factor. Attention was being given to the increase and improvement of livestock, a major asset of the country; Ayrshire and Friesian bulls were imported and distributed, rams from a selected herd were sold to reliable farmers, laboratory work on wool was carried out. Yet other lines of progress were dairying, with experiments in cheese production, the breeding of improved mules and donkeys, the increase of egg production by improving poultry breeds. The allotment by the Development Board for the period 1951–6 was nearly 2 million dinars for agricultural research, 3½ million for small-scale reclamation schemes, 1½ million for animal husbandry, and a million for swamp reclamation. The need for a measure of integration between animal husbandry and crop production, hitherto divorced, was realized, as well as the broad essential singleness of the effort which must be made in the fields of agriculture, irrigation, land settlement, rural education, and the provision of capital. It seemed certain as the nineteen-fifties opened that if this effort were made and sustained by public and Government, and in the absence of any general calamity, the prospects for agricultural development in this wide and favoured territory, within the ultimately fixed limits of its river-water and rainfall resources, exceeded those not only of any Middle Eastern country, but of any territory of comparable size elsewhere in the world; the growing of food for less fortunate nations could prove, indeed, to be the main part of 'Iraq's material contribution to humanity.

In the care of its forests not much had yet been accomplished beyond the limits of study, experiment, and the establishment of tree-nurseries; the wide but neglected forest areas (p. 29) of the north still lay untended and unimproved, lacking notably a modern forest code, a staff of trained foresters, and even detailed exploration. Some steps had indeed been taken to provide fire protection and to carry out by helicopter and air photography the first forest surveys, but few to prevent uncontrolled cutting, grazing, and trespass by the villagers. One million dinars were allotted by the Development Board for forestry development in 1951–6. The significance of these areas to soil erosion, silt deposit, and river flooding was understood, and plans were being prepared on these and allied matters; but only a beginning had been made to solve these problems or to move towards the large-scale action which must be involved, or to provide the 'Iraqi public with sources of fuel and timber at present lacking.

Although sea fishing, based on the Shatt al-'Arab, was but a limited resource, the rivers and swamps of the territory were the source of a fish catch estimated at many thousands of tons a year, and export of fish to the Levant—and in particular to the Jews in

Dowson G-5 (1929-30) 1932 MH1 Iraq MH1

312 The inadequacy of the existing irrigation system is generally recognised in so far as it relates to the great incompleteness of the network of engineering works needed, such as storage reservoirs, flood embankments, regulator constructions, delivery and drainage channels: but it appears at present to be insufficiently appreciated in the country that the proper utilisation and maintenance of these expensive works is even more important than their construction and probably calls for greater technical skill at the outset. It is a serious mistake to suppose that the management of a great engineering undertaking, such as a national irrigation system, is a simpler problem than its design and construction, or that such management can be economically and wisely left to inexpert hands or to officials primarily occupied with other duties.

•242 The primitive methods of cultivation, stock-keeping and disposal of produce prevalently practised, as well as their marked effect on the quantity and quality of the country's output and on its reputation in the world's markets, have been repeatedly emphasised and need only be mentioned here.

439 To build up her prosperity el 'Iraq must evidently develop her export trade both quantitatively and qualitatively. It is therefore of

TABLE IX. MAIN AGRICULTURAL EXPORTS DURING FIVE YEARS 1925-6 TO 1929-30

Product	Quantity in thousands of tons	Value in lakhs of rupees
Living animals (horses, camels, cattle, sheep, goats, etc.)	835·6*	87·7
Raw cotton	3·2	32·7
Dates	634·3	902·1
Grain, etc. (barley, pulse, rice, wheat, etc.)	366·2	449·1
Hides (cow, sheep, goats, wild animal, etc.)	9·5	171·9
Intestines (casings)	0·6	70·1
Raw silk	0·005	0·7
Tobacco	0·8	9·2
Raw wool	32·4	368·2

*Thousands of animals.

great importance to follow the statistics of external trade continuously and to endeavour to adjust the country's agricultural output unceasingly to world demand. Unlike the various land statistics, which have proved so difficult to collect and so unreliable when collected, the Trade statistics kept by the Customs and Excise Department appear not only to be in excellent order but to be used. No attempt will be made to discuss these valuable figures here: but the nature, quantity and value of the principal exports of agricultural products during the five years 1925-6 to 1929-30 in the accompanying table should be noted.

242 It is in experimenting in the culture of new or improved products required by the world, in adapting them to local environment, in multiplying them for local growth, and in demonstrating their successful cultivation and disposal on a commercial scale, that scientific agricultural research stations, progressive landed estates and well-managed marketing bodies, have such an indispensable part to play in the general development of the country's agriculture.

185 The establishment of an efficient national irrigation system and the application of the lessons of progressive scientific research and experience elsewhere must be recognised as two of the fundamental conditions of

3: Clark S-5 (1950)1951 MH1 Iraq MH1

higher levels of education but, in general, the basis for most of them is acquired in the primary school. Before considering, therefore, ways and means of advance towards compulsory primary education for all children, it will be desirable to ascertain to what extent these general educational needs are met in the existing primary schools system. If it should be found that the primary schools do not adequately meet these needs, it may be wise to advocate qualitative reform in primary schooling before ambitious quantitative advance.

SPECIAL EDUCATIONAL NEEDS

In addition to these general educational needs, and partly arising from them, there are two outstanding needs which are connected with the economy of the country and the transitional stage through which an important section of the population is passing.

The Need for Realistic Rural Education. The first outstanding need is that of realistic rural education. In a country whose future development and prosperity is so bound up with the necessity for agricultural improvement, it is important that the schools of the countryside should relate their activities to rural pursuits. As the following extract from the report of the Monroe Commission, issued in 1932, indicates, there is nothing novel in directing attention to this vital educational requirement in Iraq:

> Agriculture as a science is comparatively recent. As a science it has not yet entered Iraq to any great extent. Here it is still predominantly a rude craft; most of those who live by agriculture use primitive methods of farming and stock-keeping of generations or centuries ago. If these out-worn methods are to be replaced by better ones the change must be worked through education, and largely through the village school. . . .
>
> If the work of the village schools is to be determined by the actual and present needs of the people they are set up to serve, then they should first of all become a means of teaching the people how to make a better living from the land. The village school should provide more vital instruction and training in improved agricultural methods; manual arts; the importance of native industries; the proper breeding and selection of seeds. . .

With certain modifications, due mainly to the efforts of the Directorate of Agriculture, these observations of the Monroe Commission are as valid in 1950 as they were in 1932. They will need to be taken into account at a later stage of this study when the type of advance towards compulsory education in the countryside is being considered.

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

on the land. There is apt to be increasing pressure on the landowner to take such steps as a result of the growing opportunities for alternative employment created by a large increase in public expenditures on development, the expansion of industry and the opening of state lands to settlement. In fact, unless the sharecropper's status is improved, there is a great danger that there will be a continued flight of labor from the land, impairing the country's agricultural production.

The government itself has made only a modest contribution to the advancement of agriculture. The Directorate-General of Agriculture is only a subordinate department in the Ministry of Economics and has been severely handicapped by lack of funds and a shortage of competent agricultural officers. While it has had some success in combatting pests and diseases and in the extension of such crops as cotton and citrus fruit, too little attention has been devoted to practical research, and almost no field work has been carried out to assist cultivators in improving their crops and methods of cultivation. The expenditures of the Agriculture and Veterinary Departments were actually cut from ID 1,160,000 in 1948-49 to ID 540,000 in 1950-51 and, at the latter figure, represented only 1.8 percent of the total budget outlay. Expenditures on both agriculture and irrigation 1950-51 amounted to only 6.7 percent of the total.

Plans for the future now envisage large water storage and irrigation projects to provide more water for land already in use and to increase the area under cultivation and provide for the settlement of new land. These plans are in general quite sound. They will be largely ineffective, however, unless at the same time more stress is placed on arresting the deterioration of land already in use by extensive drainage schemes and on raising the productivity of agriculture by other means. The establishment of an efficient extension service and the provision of incentives to improve methods of cultivation are particularly important in this connection.

Expansion of Area under Cultivation: Irrigation

Extension of the area of land under cultivation is vitally important not only to an increase in production, but, above all, as

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and trained medical and veterinary assistants to control disease. In the North, livestock shelters would reduce the high mortality in the winter. In the long run, however, livestock raising is likely to become increasingly the preoccupation of settled farmers, particularly as the area under cultivation is gradually extended and natural pastures correspondingly restricted. Mixed farming, in which livestock raising based on the production of fodder crops would have its appropriate place, would greatly enhance incomes, especially because it would give more year-around employment to farmers who now, with the concentration on winter crop production, are underemployed for the greater part of the year.

5. Research and Education: Incentives

While is it relatively easy to point out what should be done to improve agriculture and livestock, devising the means to accomplish the improvement is incomparably more difficult. The means available to the state for a direct attack on low productivity are necessarily limited. The government can, of course, lay out drainage schemes, make more water available, provide facilities for combatting plant and animal diseases and pests, establish livestock shelters, assist in organizing cooperatives, and furnish more ample credit facilities. However, except perhaps in the new settlement areas, the state cannot prescribe better crop rotation, the use of improved seeds, better methods of cultivation and the like. These depend on private initiative which can at best only be stimulated and encouraged by the government. In some circumstances farmers can be relied upon to seize the initiative, as in the case of cotton where high prices have stimulated a rapid expansion of production. In the main, however, greater productivity depends on the success of efforts to persuade large numbers of landowners and cultivators to change their time-hallowed methods and techniques. For this reason principal reliance will have to be placed on education, supported by practical research and supplemented where feasible by financial incentives provided by the government.

First of all, steps should be initiated immediately to organize an effective extension or advisory service to farmers. At present the Department of Agriculture has less than 25 qualified agriculturists capable of research and educational work, and much of their

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

attention is devoted to administrative and regulatory tasks. The relatively small number of agricultural officers in the provinces are engaged primarily in the distribution of seed, in the collection of rather inadequate statistics and in administrative tasks. They lack the time, the transport facilities, and, often, the ability to counsel farmers on methods of improving their output. While shortages of trained personnel will prevent the immediate establishment of a full-time extension service, the Mission recommends the early appointment of a director of extension and education whose first responsibility would be the recruitment and training of personnel for such a service. The need is for people well-grounded in practical, general agriculture rather than specialists. The facilities of the secondary agricultural school and the higher agricultural institute at Abu Ghuraib might well be used to train the required people, provided the quality of the staff is improved and the curriculum revised, especially in the direction of giving more practical training in agriculture. It will be impossible, however, to attract properly qualified people to an extension service unless the status of agricultural officers in the provinces is considerably raised and their conditions of service, particularly housing and pay, are greatly improved.

The effectiveness of such an extension service would be greatly enhanced by the organization of demonstration units on strategically located government and private farms. There, farmers could be brought to see with their own eyes the practical advantages of improved methods of raising livestock, poultry and farm crops. At the same time the extension service might work closely with the public schools in the rural areas and small towns to insure that a knowledge of the rudimentary principles of agriculture is instilled in children at an early age. Rural primary and secondary schools should give agriculture an appropriate place in their curriculum.

An extension service must be backed up by sound, practical research which will develop new crops and more productive varieties, improved livestock breeds, better methods of cultivation, and more effective control of pests and diseases. At present there are few people engaged in full-time research. Government farms are devoted primarily to the commercial production of seed, serving neither as demonstration farms nor as centers for extensive

7: International Bank N, 6-4 (1951) 1952 MBH Iraq Mfil

research. The Mission recommends that in the future such farms should be used primarily as experimental stations. Seed for distribution to farmers could be produced on land surplus to the needs of the experimental stations or on a contract basis under appropriate government supervision on private farms. The Mission suggests that immediate steps be taken to secure a research director to coordinate all existing research and to recruit a gradually expanding staff of full-time research experts consisting partly of foreigners and partly of Iraqis.

These measures will bring about an improvement in agriculture only very gradually. In the short run they will need to be supplemented by positive financial incentives. Most farmers will probably prove unwilling or unable to invest money or time in the cultivation of fodder crops or the use of fertilizers unless they are convinced through practical experience that such an investment is really worthwhile. In order to induce farmers to experiment themselves, the government may wish to consider providing free seed for fodder crops and defraying part of the cost of fertilizer, or, alternatively, making a flat money payment per donum to those undertaking to use fertilizers or grow feed. Such incentives should, of course, be offered only as long as is necessary to demonstrate the value of improved methods. The provision of credit for the acquisition of machinery, fertilizers and other means of production will also be helpful in this respect.

It has already been pointed out that the existing sharecropping system, coupled with the shifting nature of cultivation, militates against the introduction of soil-building and forage crops. Under present conditions the landlord will find it difficult to compel the fellah to grow such crops unless the fellah is actually paid for doing so. The Mission therefore suggests that the difficulties inherent in the sharecropping system, as well as the advisability of changes in this system, be studied by an expert on land tenure.

Tobacco and the Tobacco Monopoly

The Mission has paid special attention to tobacco, not only because cultivation of this crop is of considerable importance to the Kurdish farmers of the North, but also because tobacco leaf is

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TABLE 15

MERCHANDISE TRADE
(in millions of dinars)

	1949		1950	
	Exports	Imports	Exports	Imports
Customs returns	12.4	40.5	22.0	37.6
Less				
Oil Companies trade	− 0.7	−10.3	− 0.8	− 8.4
"Officially" financed	−14.9	−20.0	−20.6	−24.8
Discrepancy	− 3.2	10.2	0.6	4.4

Agents). But the principal explanation of the large amount of residual imports is the import of goods "without foreign exchange." Licenses issued (but not necessarily used) amounted to ID 10,800,000 and 7,400,000 in 1949 and 1950. These were paid for with foreign exchange acquired by the methods already described. Part of this foreign exchange was, no doubt, also used for travel abroad, particularly in the Lebanon. Insofar as receipts and expenditures in "unofficial" foreign exchange did not balance in any one year, there must have been a balancing item in these transactions, representing capital export or import. No data is available on this, but it is generally believed that there has been a considerable export of capital in recent years.

IX. Government and the Economy

Until recently the goverment, handicapped primarily by a shortage of funds, played a comparatively modest role in promoting economic life. In agriculture the main effort was confined to the production and distribution of seeds, the promotion of cotton and citrus culture and the combating of diseases and pests, particularly the locusts. Some help was given through the establishment of the Agricultural Bank and of a government organization for the rental of agricultural machinery. One project for the settlement of smallholders on newly irrigated government land in the Dujaila district near Kut was initiated. Outlays on irrigation and flood control,

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There is a great need for systematic remedial and prophylactic treatment to reduce widely prevalent parasitic infections by such means as flock treatment against internal worms, and cattle and sheep dipping against external parasites. A small campaign to control sheep pox and other external ailments was begun at one time, but abandoned because of lack of funds. In the future adequate funds should be set aside to carry out a well-planned campaign of dipping, particularly in the North. This will involve the establishment of dip-tanks at strategic points in relation to the grazing grounds of the herds and flocks, the location to be worked out by a ground survey undertaken by field officers. Another important prophylactic measure would be the establishment of quarantine stations at points used for international trade in livestock.

At present many livestock belonging to the nomadic tribes die from lack of water or exposure to severe weather, either directly or indirectly as the result of lowered resistance to disease. In the severe winter of 1949 about 1,500,000 sheep are said to have died in the mountains of Kurdistan. In the South the waterholes used by the tribes tend to dry up in dry years, thus necessitating great treks to reach water during which many animals are lost. Such losses would be greatly reduced by livestock shelters in the North and more wells in the South. The shelters, which should be built at strategic points on the migration routes, would be primarily for the protection of lambing ewes and would provide emergency feed supplies for migratory flocks. A three-walled mud structure, with a roof and accommodations for shepherds and some feedstuffs, will be sufficient. Although the government has dug some wells for the use of the southern tribes, much more could be done.

Plant Diseases and Pests

The pests and diseases affecting crops have not been as great a problem as those attacking livestock. The locust plague is a periodic menace, but has been kept rather successfully under control in recent years. The systematic distribution of poison bait in hatching areas during the spring has been the most effective method of combating the locust.[9] Since the bait will be scorned when succulent green food is available, it is important also that farmers

[9] The best bait consists of mill-run bran, sawdust, sodium fluorsilicate and water and should be applied at the rate of 14 pounds of wet bait per donum.

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be made to realize that the eggs can be destroyed before hatching by cultivating infested areas to a depth of about two inches either in late fall or early spring. Once the locusts or grasshoppers begin to spread, their ravages can be arrested by applying chlordane or toxaphene as spray or dust. Sprays have the advantage of causing higher initial kills and they continue to kill over longer periods than dust. To control future outbreaks the Department of Agriculture should at all times have access to sufficient funds and have on hand an adequate amount of supplies, vehicles, spraying and dusting equipment. This has not always been true in the past.

The most destructive of several sucking insects is the Sunn pest *(Burygaster integriceps)* which does great damage to wheat and barley crops in several Middle East countries. Iraq has reported losses of 30 to 50 percent and in some sections almost total crop losses. The most common procedure used in control of this insect has been to plant early-maturing varieties of grain, since the insect does not attack after the seed has begun to harden.

Grain losses from rust and smut are sometimes quite substantial and could undoubtedly be reduced. Although the Mission made only a superficial survey, loose smut of wheat and barley and close smut of barley were noted over a considerable area. In certain sections as much as 10 to 20 percent of the seeds appeared to be smutted. Leaf rust of wheat and leaf and stem rust of barley, as well as powdery mildew, were also observed.

Cotton pests and diseases are not at present a factor in production. The pink boll worm, however, has been recorded from Basra and the boll worm *(Earia insulana)* is found throughout the cotton-growing region. *Laphygma exigua* is most common and does some damage. There are also a number of other pests. While, in the aggregate, these have not inflicted serious losses, agricultural officers should be prepared to recognize any new infestations and should be briefed on the most effective methods of control. It might be noted in this connection that the State University of Arizona at Tucson, Arizona, U.S.A., has published in pamphlet form a schedule for cotton insect control that is outstandingly good.[10]

[10] *Cotton Insect Control*, Circular 179, Agricultural Extension Service, University of Arizona, Tucson.

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In any discussion of pests the damage caused by weeds is worth emphasizing again. Poor tillage and the tendency to use idle land as pasture has caused a rapid spread of Bermuda and Johnson grass in the irrigation zone. These pests have actually forced a considerable amount of crop land out of production and have lowered the yield of such summer crops as cotton, maize and sesame.

VI. Improvement in Livestock and Livestock Products

Improvement in both the quality and quantity of livestock production is likely to be of growing importance in the future, particularly since the anticipated rapid increase in public expenditures on development as a whole will create an expanding and more discriminating market for animal products.

In general the types of livestock found in Iraq represent rather hardy animals which, through a process of natural selection, have become fairly resistant to the rigors imposed by a severe climate and inadequate feed supplies. This does not mean that improvements in breeding cannot be effected. At present breeding is largely haphazard and uncontrolled, particularly as to timing and the selection of sires. It is a well-known scientific fact, however, that the evaluation of genetic factors influencing production in any direction—meat, milk, wool, work, and the like—cannot be properly assessed unless the nutritional level is first improved, thus permitting the full genetic development of the livestock to take place. Iraq is a particularly striking illustration of the truth of the old saying that "half the breed goes into the mouth."

One of the best methods of exploring the possibility of improved breeding and the results of better feeding and other livestock practices would be to establish a number of herds and flocks of indigenous breeds of livestock as well as poultry on government farms throughout Iraq. There careful records would be kept to discover for the first time what these animals can really produce with improved feeding, breeding and management. These livestock stations could also provide progeny-tested sires to farmers for

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the second stage it might then become a complete cooperative, with the government retaining representation on the board only to the extent that its agricultural station contributed milk for pasteurization. The cooperative would of course be subject to government inspection from time to time to ensure efficient and hygienic operation. 234

(g) The government should explore the possibility of purchasing selected young calves and dry cows from the producers, keeping them on a selected irrigated farm outside of town, and rearing and breeding from these stock for resale to the milk producers.

(h) Measures to eliminate disease among dairy cattle, including testing for tuberculosis and brucellosis, should be inaugurated.

(i) The government should send two of its trained staff from the Veterinary and Animal Husbandry Department to see and examine the Bombay Milk Scheme, Bombay, India, in order to assist in solving the similar problems which confront the Baghdad milk industry.

If the government is prepared to carry out such an over-all campaign to organize adequate and safe milk supplies for Baghdad and later for other major cities, there is little doubt that UNICEF and FAO will be prepared to assist with machinery and technical assistance, providing a fair proportion of the resulting supplies of pasteurized milk were reserved for those groups in the population who particularly need them (children, nursing and pregnant mothers).

VII. Education and Research

It will be readily apparent that a program for the improvement of agricultural and livestock production does not necessarily involve large government investments. Most of all, it requires a well-directed, adequately staffed government service that can effectively assist the cultivator and the livestock keeper. Within this service the primary emphasis in the future must be on a field organization equipped to work directly with the producer in improving his methods and management and supported by a properly focussed, practical research program. 242

Such a service is unfortunately conspicuously lacking in Iraq. Within the Department of Agriculture there are less than 25

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242 trained agriculturists.[11] In each province there is an agricultural staff of five to 20 men, but the officers are not qualified to direct research or extension work. The trained staff of the Veterinary Department is correspondingly restricted. It has already been mentioned that there are only 17 trained veterinarians in its field [465] service. In 1950 the Agricultural and Veterinary Departments had only 108 and 40 officers respectively with a base pay of over ID 15 per month.[12]

The field services operate under great handicaps. The officers are underpaid and thus often supplement their income by engaging in other work or by extending special favors. Neither their pay nor their standing in the community is such as to attract promising talent. Transport or other equipment such as laboratory facilities is frequently lacking. Excessive centralization leaves little room for initiative. Even the taking of a field trip requires the consent of the central office. The staff is preoccupied with routine tasks, generally of a regulatory or control nature, to the virtual exclusion of real research or extension work. They grow and distribute seed and nursery stock, do some control work on pests and diseases, carry out inspections and collect rather inadequate information on production. Moreover, their work is rigidly compartmentalized. There is little or no contact between those dealing with livestock and those concerned with agronomy and no coordination between agriculture and irrigation.

Organization of an Extension Service

One of the principal tasks of the future should be to organize an extension or advisory service to farmers and livestock keepers. Such a service, adequately equipped with transport, would devote itself entirely to assisting the farmers and shepherds in the field. Its main emphasis would be on education through demonstration. For this purpose it would need to establish crop, livestock and

[11] These include in the Central Office at Baghdad, the director-general, two junior agricultural officers, one plant protection officer, one extension officer and one technical assistant; in the agricultural station at Abu Ghuraib, one senior livestock officer, two plant pathologists, one senior entomologist and four junior assistants; in the agricultural school at Abu Ghuraib, one director and two teachers; and in the horticultural station at Zafararia, one director, two assistants and two junior officers.

[12] With living allowances, this ranges from ID 23.750 to ID 26.750.

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poultry demonstration units in all parts of the country. Suggestions for such livestock units have already been made. In many cases it will not be necessary to establish government-owned farms, for it should be possible to stimulate the more enlightened landowners to lead the way in adopting better methods and permitting those in the neighborhood to come and see for themselves the results achieved. The ultimate goal should be to make some practical demonstration of the value of such improved methods accessible to nearly all cultivators. In addition the officers of the extension service would need to work intimately with the rural primary and secondary schools in a program to bring children a knowledge of the principles of good agriculture and animal husbandry as early as possible. They should also play a prominent role in any adult education programs launched by the Ministry of Education. For this purpose they should be equipped with visual teaching aids.

Obviously, such an extension service cannot be created overnight. The first step should be to appoint an expert who has had considerable experience in extension work abroad to recruit and train the necessary staff and take other preparatory measures. His initial staff might consist of an assistant responsible for collecting materials for use in the service and two or three supervisors to direct the gradually increasing amount of advisory work in the field. A few people should be sent abroad each year to gain practical experience of extension work. The supervisory personnel would initially have to be obtained abroad. Those officers who would work directly with farmers and livestock keepers in the field should not be highly specialized. Rather they need a good general training in agriculture and animal husbandry. In the past too much stress has been placed on specialization.

Many of the candidates for the extension service could be educated at the secondary agricultural school and the more advanced institute at Abu Ghuraib. The first of these now gives a three-year course to students who have completed three years of secondary schooling while the latter provides a two-year advanced course to graduates of secondary schools. The institute's course has recently been extended to three years and will soon be increased to a full four years leading to a bachelor's degree in agriculture. Both these schools should be in the position to train

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242 874 forward-looking men for actual farming as well as for posts in the agricultural administration and the extension and educational service. Unfortunately their teaching staff and curricula have been deficient in many respects. The teaching staffs should be strengthened by recruiting additional qualified teachers abroad and by using specialists engaged in agricultural research to teach their specialties. More practical agricultural work should be incorporated into the curriculum. Students in the institute, for instance, might be required to remain on the government farm at least one or two summers and complete a course in practical agriculture. This course would include the actual operation of farm machinery, the establishment of simple plots to demonstrate yield, crop adaptation and other agricultural techniques, and the care of livestock. It is important that students actually work with their hands during such a course, for there is no room in a field extension service for officers who consider manual work degrading. In addition to their regular instruction, both schools should be equipped to give brief courses from time to time in special subjects such as the operation and maintenance of machinery, animal husbandry, soil analysis, forestry, and techniques of extension work.

242 It will be some years before sufficient people can be recruited and trained for an adequate extension service. In the intervening period a complete separation between the extension service and the regulatory and inspection service cannot be carried out. Those newly trained would join the existing service and carry out both types of work, with the expectation, however, that growing emphasis would be placed on extension work. Consideration might be given, however, to establishing a full-time extension service as soon as possible within one or two areas limited to a few selected *qadhas*, so that different methods of working with farmers could be tested.

Ultimately it will be desirable to separate the extension service from the inspection and regulatory service. The latter might then be organized into two sections: one dealing with control of injurious pests and diseases, maintenance of standards for agricultural and livestock products, fertilizers and insecticides, and surveys of production and land use; the other concerned with the production, processing and distribution of pure agricultural seed

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and nursery stock. The first of these sections should have adequate laboratory facilities for identifying plants, insects and diseases and for analyzing chemicals, pesticides, fertilizers, feed and food products. The second section would need better equipment than is now available at Abu Ghuraib to test, clean and process seed. It would also require at least three nurseries—one each for the northern, central and southern parts of Iraq—to propagate needed fruit, nut and citrus stocks. Seed stocks of proven strains would have to be either imported or produced locally either on government farms or on private farms under contract. Experience indicates that soil and climatic conditions are favorable to the production of seed of the most important field crops, as well as alfalfa, berseem clover and many of the grasses.

The inspection and regulatory service in the field will presumably exist separately for agriculture and animal husbandry under the direction of the departments respectively responsible for these subjects at Baghdad. Ultimately, however, the extension service should be under the unified direction of a single director, particularly since it is so desirable in the future to integrate animal husbandry with agriculture.

Establishment of a Research Department

An extension service will need to be complemented by a staff engaged in practical research and experimental work and a small staff of agricultural statisticians and economists. The first will develop and test new and better strains of seeds and stock, experiment with different methods of soil cultivation and fertilization, explore means of improving livestock breeding and feeding, and the like in order to develop the most effective and best adapted agricultural and livestock practices for practical application through the extension service. The small staff of statisticians and economists will be concerned with developing a more accurate picture concerning farm and livestock production and land use. It will study marketing problems and provide advice on the pattern of agricultural and animal output that is likely to be most remunerative for the farmer in various sections of the country.

It is important that a Department of Research and Experimentation be established within the ministry charged with respon-

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sibility for agriculture. Such a department should gradually be staffed over the next five years with trained personnel able to devote full time to research and experimentation. At present those engaged in research are generally charged with other duties as well. Until more staff can be trained, the available personnel will presumably have to discharge several functions. It is strongly recommended, however, that immediate steps be taken to recruit a man with wide experience in research as the director of the new service. It would be his responsibility to coordinate such research as is now being carried on both in agriculture and animal husbandry and to build up a full-time staff. The research department should have ample facilities and therefore have jurisdiction over all experiment stations. Government farms are now primarily devoted to commercial production of seed and nursery stock rather than to research. In the future their principal task should be to serve as experimental and demonstration stations. Only such land as is surplus to these needs should be turned over to commercial seed or stock production. Under those circumstances part of the seed production may have to be contracted out or grown on newly established government farms.

The research department would concentrate on the following fields:

1. *Soil management and conservation.* This would include the initiation of a complete soil survey to determine the properties of different soils by field and laboratory studies, classify the soils by their properties and possible uses and summarize the information available on each type with respect to its tilth, fertility, adaptability to particular crops and the like. Such a survey would be extremely useful in planning land use, especially in the selection of land for irrigation and drainage projects. The first step would be to carry out a preliminary reconnaissance survey. The advantages of the intensive cropping system, involving proper crop rotation and the use of fertilizer, should also be studied in comparison with those of the crop-fallow system. Finally, the various methods of conserving moisture through better cultivation, timely destruction of weeds and the prevention of soil erosion could be tested.
2. *Introduction of new and better varieties of crops.* Among the subjects to be examined in this field would be the suitability of different types of forage crops, including

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grasses and legumes; new grain sorghum varieties and hybrid maize strains; and the adaptability of sugar beets and sugar cane.

3. *Horticulture.* This work, which should be centered at the Zafarania station, would cover vegetables, dates, nuts, citrus and other fruits. Tests should be carried out in the northern and southern as well as the central part of Iraq.
4. *Tools and machinery.* This type of work would test the suitability of various kinds of hand, animal-drawn and power tools for different conditions and jobs and especially seek to develop cheap but effective animal-drawn equipment and hand tools.
5. *Forestry.* Research on forestry should be developed with particular attention to experiments with controlled grazing on range and forest land and the selection and culture of trees suitable for various uses and sections of the country. It would be desirable to carry on this research not only at the forest nursery in Erbil, but also at the Abu Ghuraib and Bakrajo stations.
6. *Animal husbandry.* This would focus on the development of the most suitable pasture and feed crops and the best methods of preserving fodder for winter feeding. As already indicated, it would determine to what extent existing types of livestock could be improved by systematic breeding and feeding. The cost and results of feeding with different oilseed by-products and date by-products should be studied and a laboratory established to work on the relative value and digestibility of various feedstuffs. A research program on range development should also be carried out, but jointly with the forestry service. The government has already taken a constructive step by inaugurating a scheme near Chemchemal in the province of Kirkuk for experimenting with afforestation and rotational grazing. The site appears to be unsuited, however, for the production of low-priced fodder to aid in overwintering cattle. Experiments should also be conducted with the reseeding of pastures, using both foreign and indigenous grasses and clovers and with the possible use of fodder trees such as mesquites.

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Tigris, and a large reservoir at Bekhme in the mountains on the Great Zab. 312
The Mission endorsed these projects and recommended others to compensate for diversion and to balance the systems.

The Iraq Irrigation Development Commission believes that the area under irrigation can be increased to 12 million acres by the installation of additional storage facilities, by drainage, rehabilitation, and by new supplies of water.[44]

It is agreed generally that the rain-fed zones in the north must continue to depend primarily on rainfall. Although no accurate estimates are available, the total area which might be available for cultivation in this area is thought to be substantial.

Along with irrigation, an important means of improving productivity is 241
drainage. This would have an immediate effect; other proposals depend on 311
the necessarily slow process of persuading farmers to abandon age-old methods of cultivation.

As much as 20 to 30 per cent of the cultivated land is said to be abandoned because of salt accumulation. On a large part of the remaining land, yields have declined as much as 50 per cent. Drainage—almost totally neglected—the report concluded, should therefore be prosecuted with utmost vigor.[45]

MECHANIZATION

Because of the cost, the Mission predicted that mechanization would pro- 241
ceed slowly. This conclusion was reached in the face of experience which 407
shows that tractor ploughing may increase yields 20 to 50 per cent, largely through more effective destruction of weeds and better preparation of the soil.[46] No doubt mechanization will become increasingly important as additional land is placed under cultivation and labor becomes scarce.

About 750 tractors and 320 combines are in the country at the present time. A government agency owns 75 of the combines and 81 tractors and plans to import an additional 2,500 tractors and 550 combines with auxiliary equipment.[47] About 50 per cent of the machinery will be retained at government-owned tractor stations and rented or let out under contract.[48] The rest will be sold on easy terms to the farmers.

The International Bank approved a modified version of this machinery program but suggested that rental charges be increased to make the project self-sustaining, and adequate repair shops and demonstration and training programs were recommended.

SOIL BUILDING

It is obvious that the fertility of the soil needs to be replenished. [134]
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Cultivation of soil-building and forage crops is said to be virtually unknown. Attention needs to be given to the production of legumes. Commercial fertilization must be studied and, if possible, plants should be built to produce inorganic and organic materials. Soil analyses also are generally needed.

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44 *Economic Development of Iraq, op. cit.*, p. 16.
45 *Ibid.*, p. 17.
46 *Ibid.*, p. 18.
47 *Ibid.*, p. 19.
48 *Final Report of the United Nations Economic Survey, op. cit.*, p. 33.

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COTTON IN THE MIDDLE EAST

RESEARCH AND EDUCATION

654 242 At present the Department of Agriculture has less than 25 qualified agriculturists capable of research and educational work, and most of their time is said to be devoted to administrative and regulatory tasks.[49] A complete program in research and extension is needed. Such a program is being developed gradually now with the help of the various technical assistance agencies.

CREDIT

452 652 Production credit facilities are almost non-existent. An effort is being made, however, to increase the resources of the state-owned agricultural bank to provide adequate production credit and to establish storage facilities for crops. According to the United Nations' special reports, moneylenders' interest rates to farmers for crop production were 30 to 40 per cent before the government recently established the agricultural bank.

COTTON

248 Cotton has never been particularly important in Iraq, from the standpoint of either the acreage involved or the total production. Its potential, however, is great.

Table 33

IRAQ: Statistics on Cotton Production and Distribution Specified Years, 1920-1951

Year beginning August 1	Acreage	Yield per Acre	Production	Consumption	Exports	Imports
	Acres	Pounds	Bales			
Average 1920-24	NA	NA	808	NA	NA	NA
Average 1925-29	NA	NA	2,977	NA	NA	NA
Average 1930-34	3,751	159	1,240	NA	NA	NA
Average 1935-39	53,099	97	10,773	NA	NA	NA
Average 1940-44	73,000	62	9,409	NA	10,477	2,845
Average 1945-49	21,619	100	4,493	4,000	3,153	2,733
1950	100,000	183	38,121	7,000	31,000	0
1951	135,000	135	38,000	10,000	1,887[1]	

[1] Exports, August through November.

SOURCE: Office of Foreign Agricultural Relations, United States Department of Agriculture, and International Cotton Advisory Committee.

Before the war, production averaged only about 12,000 bales and slightly less in the postwar years through 1949. Higher prices throughout the world, together with the export controls imposed by the United States and the shortage of cotton, sent production to about 38,000 bales. It would have been three to four times as large on the basis of the planted acreage had it not been for heavy insect damage.

AREA

About two-thirds of the cotton is produced under irrigation in the vicinity of Baghdad and Kut on the Euphrates and Tigris Rivers. These two areas, together with three or four other smaller ones, account for about 88 per cent of production. Some 10 to 12 per cent is produced in Northern Iraq, mostly around Mosul, and about 2 per cent in Southern Iraq, from Basra north along the river.

[49] *Economic Development of Iraq, op. cit.*, pp. 98-99.

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COTTON IN IRAQ

Iraq hopes to expand the cotton area greatly, especially in the northern sections where the winters are cold enough to kill the insects. Here there are millions of acres, suitable from the standpoint of soil and temperature, which could be used for cotton if the available water is utilized for irrigation to supplement rainfall of 10 to 15 inches. The few protected valleys with rainfall high enough to permit cotton production without irrigation are small in total area. 248

The northern areas are now sparsely populated and expansion of cultivation is expected to be under complete mechanization. The government is planning to buy a cotton picker for experimental purposes, looking toward the possibility of using them in this area later, after the proposed irrigation facilities are constructed.

Expansion doubtless will depend on the rapidity and extent of the irrigation development.

YIELDS

Historical data on yields are sketchy and not too dependable. These records indicate a prewar range by years from 80 to over 300 pounds of lint per acre and postwar yields from 67 to 180 pounds per acre. The large variations are attributed to insect damage. This was the case in 1951 when the yield averaged about 135 pounds.

Yields at the cotton experiment stations also vary greatly from a little over 100 pounds to as much as a bale and a half. The average is about half a bale per acre. Experiment station specialists insist that their yields are from two to four times higher than those on private farms in the area.

VARIETIES

During the twenties a cotton called Mezo-White, developed in Iraq from a strain of an American Upland called Weber 49, was generally planted, but about 1930 it was supplanted by Rogers Acala. Some reports say the seed of the Acala cotton is badly mixed and both the yield and the staple have deteriorated. Pure seed is available out of the selections from the original Acala, and planting of the so-called "old" Acala is now prohibited by law. This law, however, is not completely effective. 248 242

Several new upland varieties now are being grown experimentally, and some look very promising, especially Coker Wilt from which pure seed is now being distributed. The new Acala strains and the Coker cottons are said to staple about 1 1/32 inches as a rule and run up to 1 1/8 inches under very favorable conditions. In 1951-52 about 90 per cent of the crop was Rogers Acala and 10 per cent Coker.

A small quantity of an indigenous Asiatic *herbaceum* called Levantine is still planted primarily for local use by the farmers for wadding and padding, and there is some interest in trying to improve the seed.

CULTURAL PRACTICES

Formerly the tenants prepared the land with primitive ploughs, but now practically all the cotton fields and most of the wheat fields are prepared with tractors which are either owned by the sheiks or rented from the govern- 248

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other commodities. As might be expected in such a situation, the system of classification is limited. The cotton is usually sold on types. Ginners indicate they will buy and sell cotton themselves in the future as in many other countries.

The one large cotton spinning mill is putting in its own gin to supply the mill with its requirements of around 15,000 bales annually. This will restrict merchandising to exports unless and until another mill is built.

OIL MILLS

There is one oil mill which crushes the largest part of the seed produced. The rest is exported. The capacity of this plant is to be increased and facilities for processing oil products are being added.

EXPORTS

Iraq has exported approximately 18,000 bales during each of the past two years, mostly to Germany and Japan, with smaller quantities to Holland, Italy, Spain, and the United Kingdom.

IMPROVEMENT PROGRAMS

The Director General of Agriculture has promulgated an ambitious 10-year program for increasing cotton production to about 500,000 bales. In time, he believes that on the basis of the available land and water Iraqi production can be boosted to more than a million bales. While admitting his program is ambitious, the Director General appears to be firmly convinced it can be accomplished, given adequate technical assistance.

United States agricultural experts with the Point Four Program are inclined to agree that the country's natural resources can support a potential cotton production of this magnitude. The rate of increase, they think, will depend on how effectively the technical resources of the country are organized and applied.

The Director General is highly regarded for his technical as well as his administrative ability and particularly for his driving force. He is especially well qualified to direct the cotton improvement program, having graduated in cotton agronomy from Texas A. & M. College.

Long-Range

For long-range improvements he is depending on the agricultural research agencies now being organized to develop better varieties, more effective irrigation and cultural practices, better insect control techniques, and improved methods of classification and marketing. Still in the planning stages, the research program has done some fairly effective work, especially on variety selection, propagation, and fertilization.

Insect Control

One of the main research problems is the control of insects. The government estimates that 75 per cent of the 1951 cotton crop was destroyed by insects, principally by the spiney bollworm, *Earis insulana* (Boisd.), a white fly that attacks the leaves, and by aphids. Fortunately, the Director said, the pink bollworm has not made its appearance in the country. Experiments are

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242 being conducted this year with about nine different insecticides, but a more thorough program is needed.

The FAO is supplying a specialized cotton entomologist, and the Point Four Mission is supplying a general entomologist to help develop an effective program.

656 The country has a law requiring that all cotton stalks must be destroyed, the debris burned, and the land ploughed by the first of January. In fact, the farmer is not given permission to plant cotton again unless he has complied with these regulations. Seed sterilization also is required. But the Director General himself admits the program has been ineffective. There are many host plants on which cotton insects can live, and the people do not understand the law or are not in a position to comply, especially where they are in the habit of saving the stalks for fuel.

One of the real difficulties is the growth habits of the present Acala varieties which are said to set 80 per cent of their bolls on what is called the second flush, after the end of August, when the insect population is highest. Efforts are being directed toward development of varieties that have a shorter maturing period, and early results with Coker Wilt have been encouraging.

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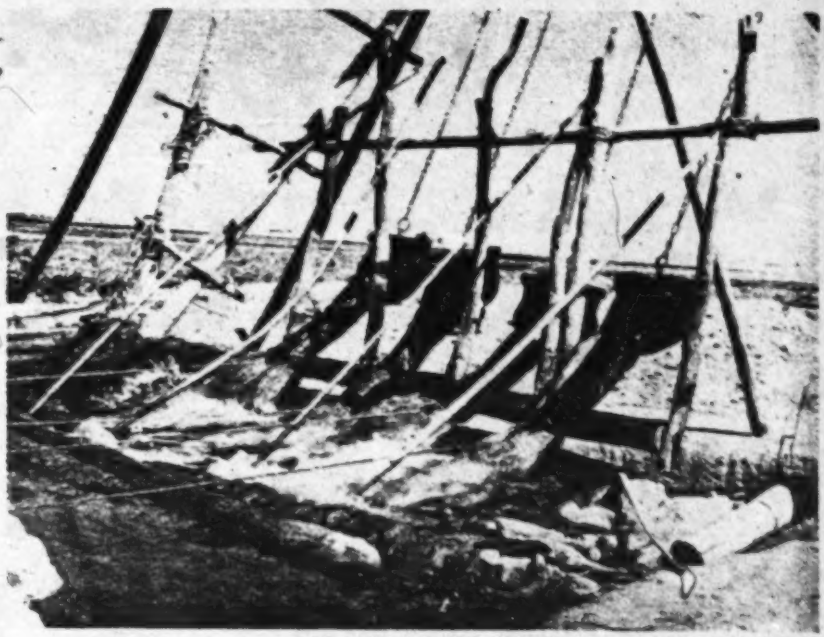

—Photo Courtesy of Technical Cooperation Administration

This irrigation system of a farm in southern Iraq dates back to Biblical times. Mules walk down an inclined track beside the well pulling the goatskin water scoops. The scoops, hauled to ground level by the mules, spill their contents into the irrigation ditch. Through the Point Four Program the United States is cooperating with the Government of Iraq in its extensive projects to modernize and improve irrigation and increase crop output.

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COTTON IN IRAQ

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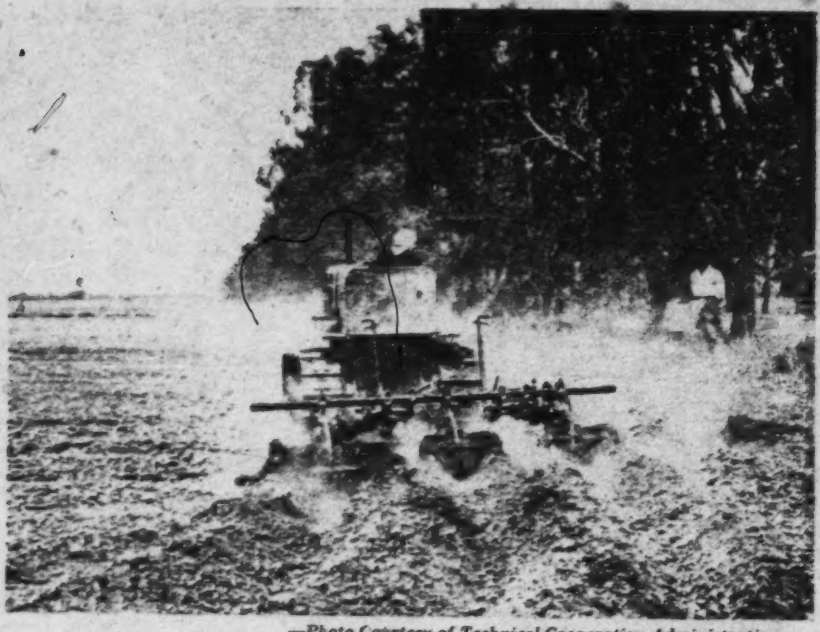

—Photo Courtesy of Technical Cooperation Administration

Modern tractors with gang ploughs are now in general use in Iraq for ploughing cotton. Because the land is so heavy, tractors are usually of the heavy-duty track type. Most of the tractors are owned by the government and rented with drivers to farmers on an hourly basis. The Iraq Government is conducting experiments with all types of mechanical equipment in the hope that new lands in the rainfed areas to the north, too sparsely populated to farm with hand labor, may be brought into production with complete mechanization.

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These plants have been found to set 75 per cent of their bolls before the end of August.

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Dr. Shelby Cain, cotton agronomist from Texas A. & M. College supplied by the Point Four Program, is concentrating on this problem in the cotton breeding program. He will be assisted by two Iraqi specialists now being trained at Texas A. & M. To some observers it appears that more work is needed on cultural practices before a full program on cotton breeding is started. For instance, the influence of planting dates, irrigation, fertilization, and cultivation on plant growths in this environment needs to be investigated before the more fundamental research in genetics and breeding can be used effectively.

Fertilization

Research on the problem of maintaining soil fertility is needed also and is included in the broad program for the future. There is an obvious deficiency of nitrogen and humus in the soil, and probably other plant foods. Much of the land in both of the main valleys has been under continuous cultivation

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242 134 for centuries, and farmers have depended on the silt deposited from the overflows to maintain the fertility. Increased use of canals and dams for irrigation has made the overflows less frequent. Experiments conducted for the past three or four years with commercial fertilisers have shown no significant benefit, but the United States experts feel the tests are not conclusive and should be continued with various soil conditioners.

While depending on basic research to stimulate long-range production, the Director General is trying to force an immediate improvement through regulations requiring the application of techniques known to be beneficial.

248 656 *Controls*

In an effort to concentrate cotton production on the better suited lands and to facilitate insect control, seed control, and other beneficial measures, regulations have been promulgated requiring government permits for all cotton acreage planted. These permits, based primarily on suitability of the soil and availability of water and labor, are issued on the recommendation of local representatives of the Ministry of Agriculture. However, the enforcement system is inadequate, and it is generally admitted that the regulation is not closely followed, especially in areas where the local sheiks are extremely powerful and are practically a law unto themselves.

654 242 407

—Photo Courtesy of Technical Cooperation Administration

At the government cotton experimental farm near Baghdad a double-handled board is used to level the high spots in a newly ploughed field. Outside the government farms little leveling is done. Through the Point Four Program the United States is cooperating with the Iraq Government in experiments and demonstrations to improve cotton cultural practices.

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COTTON IN IRAQ

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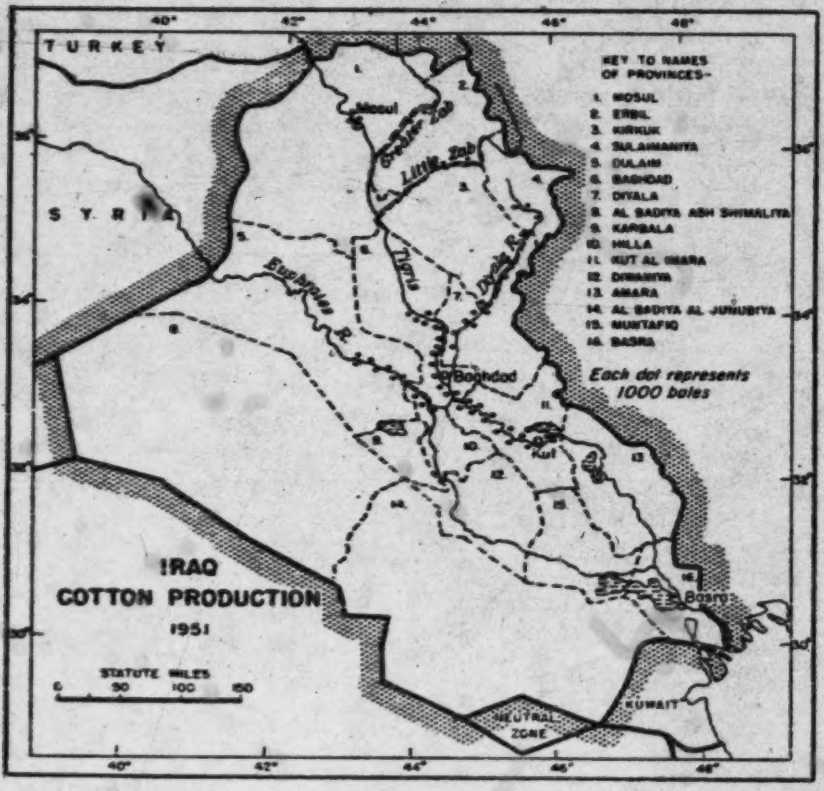

The Ministry also has a program under which pure seed imported from the United States and those propagated on the state farms are distributed free of charge to farmers who have received planting permits and who agree to the variety control. Under this program the government proposes to distribute enough seed to plant most of the area annually for the next five years. Despite this incentive, widespread evasion also is reported. Apparently the farmers still rely on the mixed seed on the theory that if one does not produce another will. (Seed distribution in 1952 was considerably less than in 1951 because of the bad crop last season.)

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The government also has established supervision over all the gins for control of seed distribution to prevent any except approved seed from going back to the farms for planting. Here again enforcement is said to be inadequate.

The mandatory insect control program is another illustration of the effort to force an improvement in cotton, and here again the results have been questionable.

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The Director General is thinking also of establishing a price stabilization program to lend further encouragement to the promotional programs, but this has not been approved as yet.

44:Matthews and Akrawi S, G-3 (1945-1946)1949 Ml Middle East
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government employment where vacancies are fewer than applicants. In 1945, 30 out of 48 graduates of the School were employed by the Department of Agriculture, 17 by the Ministry of Education, and 1 was at home, occupation unknown. Many of those employed in the Ministry of Education are teaching in the model-farm schools, a new type of primary school. 874*

The first- and second-year students in the School of Agriculture have a thirty-six-hour week. In the first year they study Arabic language, English, physics, chemistry, agronomy, botany, zoology, practical agriculture, surveying, and carpentry. In the second year they study Arabic, English [242] organic chemistry, insects, bees, animal-breeding, irrigation, agricultural machinery, practical agriculture, vegetables, meteorology, carpentry, and veterinary medicine. In the third year the program is increased to thirty-eight hours a week and consists of English, soils, agricultural economics, cooperatives, agricultural accounting, plant products, dairying, plant diseases, agricultural machinery, practical agriculture, fruits, flowers, carpentry, and chicken-breeding. There is no organized physical education, but the students play basketball and volleyball in their leisure time. There is a supervised-study period of two hours each night. All students live at the college at government expense.

Plans are underway to introduce some of the vocational and special types of education into the secondary-school system. The central idea is to have vocational schools offer programs of secondary standard, combining academic and vocational subjects. These courses would lead, through public examination, to Intermediate-School and Secondary-School Certificates. As the combination of the two programs requires more time, the Higher Committee on Studies and Curricula has decided to have a six-year secondary vocational school, with four years of intermediate and two of preparatory work. The plan embraces the technical, agricultural, commercial, and home-arts schools and may eventually include the Fine Arts School.

Students who pass the public primary-school examination will be admitted at government expense and first given a two-year vocational and academic program. At the end of two years those who pass a selective examination conducted by the Ministry in both types of study and who show promise of benefiting from a full secondary course will be given another two years leading to the public intermediate-school examination. Those who pass the intermediate examination will continue with a higher vocational-preparatory course of two years ending with a vocational-secondary certificate entitling the student to admission to higher institutions of the same type. Students who fail the second-year examination will be

241 commercial crops in the rain-fed zones of the north; dates, cereals and cotton, in the south. The date-palm groves in the irrigated lands along the Shatt al Arab and the Euphrates rivers, and in scattered areas along the Tigris, furnish almost one third of the 233 world's supply of dates. Sheep, goats, cattle and other livestock are raised in large numbers by the nomadic and the seminomadic 439 peoples. The chief agricultural exports are dates, barley and other grains, cotton, wool, hides and licorice: this last-named item grows wild in many localities in the south. 242 The government is promoting the adoption of modern methods of farming and animal husbandry and the expansion of irrigation facilities. It operates special agricultural schools and experimental farms in different parts of the country, as well as a date research station near Basra. Within the last few years it has initiated settlement and demonstration projects on state lands at Dujayla, near Kut; at Shahrizor, near Sulaimaniya; at Huwaija, near Kirkuk; and at Sinjar, near Mosul.

125 With the exception of the oil reserves, the mineral resources of Iraq are negligible. Small deposits of lignite, gypsum, sulfur and other minerals are known to exist in the north, while salt beds are found in widely 472 distributed areas. Industrial development is 438 slight, in spite of the impetus supplied by the shortage of materials during the recent war years. Small craft industries flourish in the urban centers, and a few modern factories have been established in Baghdad and Mosul for the processing of local products. These consist primarily of plants for the manufacture of textiles, cement, bricks, distilled liquors, soaps and cigarettes.

135 The petroleum industry has expanded rapidly since the discovery of oil, in 1927, at Baba Gurgur, in the Kirkuk region. The reserves, which are reputed to be among the richest in the Middle East, provide a pri- 471 mary source of wealth for the country. The Iraq Petroleum Company holds concessions, originally granted in 1925, covering the lands east of the Tigris River and north

433 There has been little change in the crop pattern in recent years. In 1950,
311 under the stimulus of rising world prices, the area planted to cotton increased,
241 but the damage caused by pests, together with the fall in prices, caused heavy losses and led to a shift to other crops. There has also been an extension of the area planted to fruits and vegetables.

242 The Government has taken several important measures to aid agriculture. In 1952, in order to improve the quality of dates, the government-owned Iraqi Dates Association contributed 49 per cent of the capital of a company which will market the crop. In 1953, the Government appropriated funds for the building of grain silos with a capacity of 150,000 tons, in order to improve quality, since low grading depresses export prices. The Agricultural Machinery Administration rents machinery to farmers and, in addition, is responsible for testing and demonstrating new machinery, licensing of imports and controlling the distribution of the limited supply of spare parts". 1/ The activities of the Agricultural Bank are discussed below.

423 Among the major obstacles to agricultural development has been the land
241 tenure system. The uncertainty of land titles has by now been largely eliminated by the work carried out since passage of the land settlement law of 1932. By the end of 1953, titles to 16,126,000 hectares had been settled; this represented 68.4 per cent of the area of the country, excluding the desert regions. Another obstacle is the unequal distribution of land. The agricultural census showed that there were only 125,000 holdings, with an average area of 51 hectares per holding. Of these, 24,000 holdings were under 1 hectare, 26,000 between 1 and 5 hectares, 16,000 between 5 and 10 hectares and 19,000 between 10 and 20 hectares. Thus, 85,000 holders, or 68 per cent of the total, owned about 3 per cent of the total area. At the other extreme, some 33,000 holders, with over 100 hectares each, owned some 85 per cent of the total area. The majority of the agricultural population is landless.

311 The Government has attempted to remedy this situation by settlement schemes
241 on government-owned land, which accounts for nearly two-thirds of the settled
185 area. Following a successful experiment at Dujaila, 4,284 farmers were settled, in five projects with a total area of 198,000 hectares, and by the end of 1954, 10,200 farmers had been settled on 510,000 hectares. 2/ Farmers are organized in supply and marketing co-operatives. They are given the land free of rent for ten years, after which those who have made good are granted title without charge. 3/ Further projects are under way, including the distribution of 1,125,000 hectares in Mosul province, the distribution of 100,000 hectares near Baghdad, the expansion of the Hawijah settlement and the distribution of land near Basra and along the southern Euphrates. 4/

1/ International Bank for Reconstruction and Development, The Economic Development of Iraq, page 20.

2/ The Iraq Times (Baghdad), 25 October 1954.

3/ For further details see United Nations Department of Economic Affairs, Progress in Land Reform (1954), page 105.

4/ The Iraq Times, 14 December 1954, 4 January 1955, 8 January 1955 and 7 February 1955.